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ABSTRACT

Appropriate for secondary school social studies, this booklet considers the dilemmas and choices confronting Americans concerned with their environment. The document contains five sections. The first section, "The Gross National By-Product," discusses the progress that has been made in reducing air and water pollution while the nation has only begun to confront the environmental problems caused by other, more insidious forms of pollution. "Acceptable Risks, Unacceptable Hazards," covers the difficulties posed by deciding how much risk is acceptable. "Assigning Responsibility for a Legacy of Neglect" deals with the choices that need to be made about who should bear costs for the cleanup of abandoned dump sites like Love Canal. "Deciding What to Do about the Wastes We Produce Today" discusses the lack of consensus about waste disposal. "Defining an Environmental Ethic," covers the need to establish the trade-offs and priorities necessary to ensure sometimes conflicting goals, such as a healthy economy and environmental protection. Two self-administered questionnaires intended for completion before and after participating in a public forum or reading the booklet are included as well as a list of recommended readings. (IS)

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NATIONAL ISSUES FORUM

ED255432

Progress has been made in improving the quality of air and water, but hard choices remain about environmental protection

- ★ What steps should be taken to provide adequate protection?
- ★ What will additional measures cost?

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Difficult Choices about Environmental Protection

As you begin to read this book from the Domestic Policy Association, you are joining thousands of Americans who are participating, in communities all across the country, in the third season of the National Issues Forum. This is a collaborative effort to achieve an ambitious goal — to bring Americans together every year to address urgent domestic issues.

This series was conceived and organized by the Domestic Policy Association, which represents the pooled resources of a nationwide network of organizations — including libraries and colleges, museums and membership groups, service clubs and community organizations. It is an effort that has a special significance in an election year. The Domestic Policy Association does not advocate any specific point of view. Its goal is not to argue the merits of particular solutions, but to stimulate debate about what is in the public interest. The National Issues Forum is not another symposium for expert opinion, or an occasion for partisan politics. Rather, it provides a forum in which concerned citizens can discuss specific public issues, air their differences, think them through, and work toward acceptable solutions.

Each year, the convenors of this nationwide effort choose three domestic policy issues for discussion. This year's topics are environmental protection, health care costs, and jobs and the jobless. These are urgent issues that have been prominent in the news. In each of these areas new realities have to be faced, and important choices made. To address them is to raise serious questions about our values and priorities; they cannot be viewed only from the perspective of particular interests or partisan politics.

There is an issue book like this one for each of the topics. These issue books are intended as a guide to the debate. They provide a menu of choices. Unlike so many partisan discussions, these menus come with a price tag attached.

As the people who have participated in the National Issues Forum over the past two years know, the forum process doesn't begin and end in local meetings. The DPA schedules a series of national meetings each year to convey to elected leaders the views that emerge from these meetings. One of those meetings will take place this coming spring at the John F. Kennedy Presidential Library in Boston. The enthusiastic response to these forums over the past two years indicates that leaders are interested in your considered judgment about these issues. So that your thoughts and feelings can be conveyed in these meetings, we have provided an issue ballot at the beginning and end of this book. Before you begin reading and after you have attended the forums and given some thought to the issue, I urge you to fill out those ballots and mail them back to us.

The Domestic Policy Association's goal is to help citizens engage in discussions about what is in the public interest. As the editor of these issue books, I'm pleased to welcome you to this common effort.

Keith Melville
Editor-in-Chief
National Issues Forum

Domestic Policy Association
5335 Far Hills Avenue
Dayton, OH 45429

1. Difficult Choices about Environmental Protection

One of the reasons why people participate in the National Issues Forum is that they want leaders to know how they feel about these issues. The Domestic Policy Association has promised to convey a sense of your thinking on the topic of environmental protection both locally and at the national level. In order to present your thoughts and feelings about this issue, we'd like you to fill out this short questionnaire *before* you attend forum meetings (or before you read this issue book, if you buy it elsewhere), and another short questionnaire — which appears at the end of this issue book after the forum (or after you've read this material).

The leader at your local forum will ask you to hand in this ballot at the end of the forum sessions. If it is inconvenient to do that, or if you cannot attend the meeting, please send the completed ballot to the DPA in the attached envelope. In case no envelope is enclosed, you should send this ballot to the Domestic Policy Association at 5335 Far Hills Avenue, Dayton, Ohio 45429. A report summarizing participants' views will be available from the DPA next spring.

Part I:

For each item below, check the appropriate box to indicate if it is something

☐ we should do *now*

☐ something we should *not* do under *any* circumstance

Proposals:	**Should Do Now**	**Should Not Do**	**Not Sure**
A. Drawing the line on safety:			
1. Prevent industry from manufacturing products until it is known that they are safe	☐	☐	☐
PRO: In the face of uncertainty, we have to err on the side of safety. Many products once believed to be safe have turned out to be dangerous	**CON:** Risk is the price of all technological progress; if we insist on "zero risk," it will curtail innovation		
2. Require companies to invest in the newest and most effective pollution control technology	☐	☐	☐
PRO: Environmental pollution should be limited to the greatest extent possible	**CON:** Such requirements would be costly in terms of prices, jobs, and the ability of American companies to compete		
3. Insist on strict enforcement of environmental standards regardless of its effect on jobs or profits	☐	☐	☐
PRO: Public health is a paramount concern that outweighs all others	**CON:** We must strike a balance between controlling pollution and other national goals such as economic prosperity and low unemployment		
B. Assigning responsibility for environmental damages:			
4. Change the laws to make it easier for those whose health has been damaged by environmental hazards to be promptly compensated	☐	☐	☐
PRO: Victims have a right to prompt compensation, something that current laws do not provide	**CON:** So many people could make a plausible claim that their health has been damaged that the courts would be flooded with litigation; settlements might pose an unbearable burden on some industries		

	Should Do Now	Should Not Do	Not Sure
5. Make the government, not industry, pay most of the cost of cleaning up old hazardous waste dumps	☐	☐	☐
PRO: Wastes are generated by the production of goods which we all use	**CON:** Corporations that dumped their wastes benefited most directly, and they — not the taxpayers — should bear all the cost of cleanup		
6. Expand the cleanup of hazardous waste dumps, even if taxes have to be raised substantially for both corporations and individuals	☐	☐	☐
PRO: Cleaning up the hazardous waste sites around the nation requires much more money than is currently devoted to this task	**CON:** Neither corporations nor individuals can afford to pay higher taxes		
C. Balancing current costs against potential hazards:			
7. Require individuals and corporations to recycle hazardous wastes	☐	☐	☐
PRO: The production of these substances poses a severe health threat to current and future generations	**CON:** With current technology, recycling is both impractical and too expensive		
8. Severely restrict the disposal of hazardous wastes in landfills	☐	☐	☐
PRO: Landfills are intrinsically unsafe and will eventually leak	**CON:** Landfills are the cheapest method of disposing of hazardous wastes and they are also getting safer and safer		
9. Prohibit the sale of common goods such as plastic garbage bags and synthetic fabrics whose production generates hazardous wastes	☐	☐	☐
PRO: Alternative products are available and we should use them	**CON:** To ban all such goods would require major changes in our lifestyle		

Part II:

Check the appropriate box to indicate whether you agree or disagree with each of these statements.

	Agree	Disagree	Not Sure
10. We're not doing nearly enough as a nation to protect ourselves or the environment from pollution	☐	☐	☐
11. Existing environmental regulations already pose an unnecessarily large burden on many American industries	☐	☐	☐
12. I would be willing to pay more as a taxpayer or consumer to ensure a cleaner and safer environment	☐	☐	☐

Part III:

Background Questions

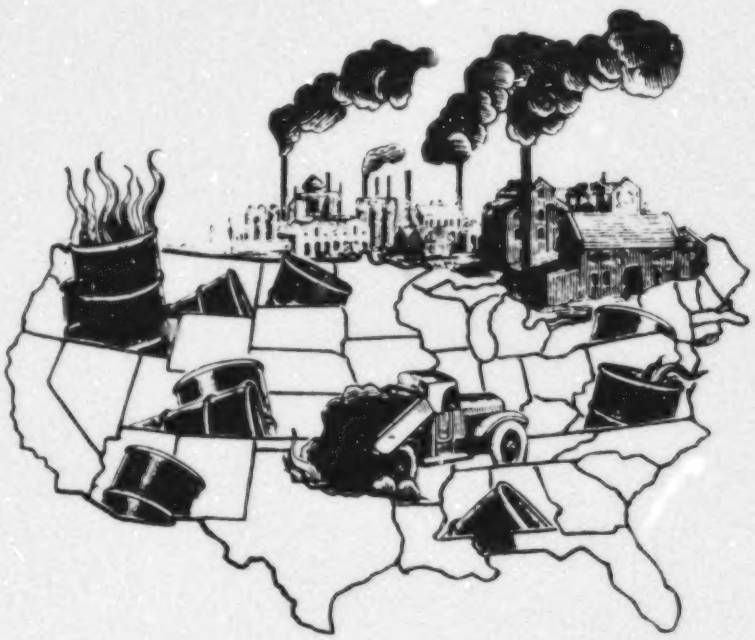
13. Did you participate in a DPA forum *last* year?
- Yes ☐
- No ☐

14. Did you (or will you) participate in DPA forums on other topics *this* year?
- Yes ☐
- No ☐

15. Which of these age groups are you in?
- Under 18 ☐
- 18 to 29 ☐
- 30 to 44 ☐
- 45 to 64 ☐
- 65 and over ☐

16. Are you a man or woman?
- Man ☐
- Woman ☐

NATIONAL ISSUES FORUM



Difficult Choices about Environmental Protection

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The Domestic Policy Association

The Domestic Policy Association is a nonprofit, nonpartisan association devoted to raising the level of public awareness and discussion about important public issues. It consists of a nationwide network of institutions — colleges and universities, libraries, service clubs, membership groups, and civic organizations — that bring citizens together to discuss public issues. The DPA represents their joint efforts to enhance what they already do by working with a common schedule and common materials. In addition to convening meetings each fall in hundreds of communities in every region of the country, the DPA also convenes meetings at which it brings citizens and national leaders together to discuss these issues and the outcome of community forums.

Each year, participating institutions select the topics that will be discussed in the Issue Forums. On behalf of the Domestic Policy Association, the Public Agenda Foundation — a nonprofit, nonpartisan research and education organization that devises and tests new means of taking national issues to the public — prepares issue books and discussion guides for use in these forums. The Domestic Policy Association welcomes questions about the program, and invites individuals and organizations interested in joining this network to write to: The Domestic Policy Association, 5335 Far Hills Avenue, Dayton, Ohio 45429.

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Progress has been made in reducing air and water pollution. But the nation is just beginning to confront the environmental problems caused by other more insidious pollutants.

2 **Acceptable Risks, Unacceptable Hazards** 10

What is at issue in the debate over the environment are some basic questions which — in a slightly different form — we face in our daily lives. Which risks can we live with, even if we'd prefer not to?

3 **Assigning Responsibility for a Legacy of Neglect** 16

Aware now that there are thousands of potential Love Canal sites across the country, we are beginning to realize what it will cost to clean up abandoned dump sites. Choices need to be made about who should bear those costs, and how individuals should be compensated for damages.

4 **Deciding What To Do about the Wastes We Produce Today** 23

Almost 300 million tons of hazardous wastes are produced each year. But there is no consensus about where those wastes should go, or what should be done to reduce that amount.

5 **Defining an Environmental Ethic** 28

We want a healthy economy *and* environmental protection, inexpensive goods *and* high safety standards, plentiful jobs *and* protection against future health hazards. The debate over the environment is a debate about trade-offs and priorities.

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The Gross National By-product

> **"Progress has been made in reducing air and water pollution. But the nation is just beginning to confront the environmental problems caused by other more insidious pollutants."**

At a time when matters of environmental policy are prominent on the public agenda, and when environmental problems ranging from acid rain to toxic substances are prominent in the news, it is easy to lose sight of the fact that widespread concern for the environment is fairly recent. The Environmental Protection Agency itself is just 14 years old.

For years, there was little regard for the environment. Considering the vast expanse of nature, it hardly seemed necessary to think about ecology or environmental stewardship. People took pride in the productivity of smokestack industries without paying much attention to the fact that the smoke pouring out of factories was both unpleasant and unhealthy. The wastes produced by industrial society — our gross national by-product — were largely ignored.

An Emerging Awareness

But in the 1960s there was growing concern about pollution and an emerging awareness that nature is a household which operates according to certain rules. The first of those rules, as environmentalists pointed out, is that you can't simply throw things out. Everything must go somewhere. As satirist Tom Lehrer put it, "What you dump into the bay, they drink for lunch in San Jose."

The second rule of ecology is that everything is connected to everything else. A dry cell battery containing mercury is manufactured, purchased, used, and thrown out. But where does it go? First, it is placed in a garbage can whose contents are collected and taken to an incinerator. There, the mercury from the battery is heated, producing mercury vapor — a toxic substance emitted by the incinerator stack. That vapor is scattered by the wind, and part of it falls as rain into a mountain lake. Bacteria in the lake convert it into methylated mercury, which is soluble and ingested by the fish. Since it cannot be metabolized, the mercury accumulates in the fish's organs and flesh. When the fish is caught and eaten, the mercury is deposited in the organs of the fisherman, where it is potentially harmful. Enjoying his chance to get away to "unspoiled" nature, and his good fortune at having fresh fish for dinner, the fisherman is unaware that he has just taken a slight additional risk to his health as part of the price of the convenience of the flashlight he uses.

That was Rachel Carson's point in *Silent Spring*, one of the most influential books of the 1960s in heightening people's awareness of the damage humans are inflicting on the environment. Troubled by the growing threat to the environment posed by industrial products, she was particularly concerned about the impact of pesticides. The book paints a vivid picture of the complex process by which DDT works its way up through the food chain in ever-increasing concentrations until it proves fatal to birds — and produces a silent spring. It was a cautionary tale and a warning that, indirectly and inadvertently, we are

poisoning both ourselves and the environment around us.

"We have put poisonous and biologically potent chemicals indiscriminately into the hands of people largely ignorant of their potential for harm," wrote Rachel Carson. "We have subjected enormous numbers of people to contact with these poisons, without their consent and often without their knowledge. If the Bill of Rights contains no guarantee that a citizen shall be secure against lethal poisons, it is surely only because our forefathers — despite their considerable wisdom and foresight — could conceive of no such problem. This is an era of specialists, each of whom sees his own problem, and is unaware of the larger frame into which it fits. It is also an era dominated by industry, in which the right to make a dollar at whatever cost is seldom challenged. The public is being asked to assume the risks. The public must decide whether it wishes to continue on the present road."

As a result of the environmental activism of the 1960s, people were startled into the realization that the balance of nature is precarious, that unwanted substances cannot simply be thrown away, that what we do to the environment will have an impact on the health and welfare of our grandchildren. And people began to realize that the most serious public health problems today result from our technical ingenuity and our consumption patterns. By the end of that decade many Americans were convinced that pollution — in its various forms — is one of the nation's serious problems and wanted something done about it.

Credit: AP/Wide World Photos

Progress on Air and Water Pollution

The most conspicuous sign that the public had come to regard environmental protection as a civil liberty, a guarantee it wants and expects from the government, was the creation of the Environmental Protection Agency in 1970. The EPA's mandate was to coordinate "effective government action to assure the protection of the environment by abating and controlling pollution on a systematic basis."

In 1970, when the first "Earth Day" was held, most of the environmental concern focused on conventional pollutants, on the quality of the air and water. There was good reason to be concerned about both of them. In the first few months of its existence, the EPA calculated that some 74 million Americans were being exposed to air that did not meet the standards of the newly amended Clean Air Act. The nation's water was also discouragingly bad. At the time, 90 percent of the country's watersheds were reported to be polluted.

Throughout the 1970s, substantial progress was made on conventional pollutants. From 1975 on, the EPA reported steady progress in reducing major air pollutants including carbon monoxide, lead, and sulfur dioxide. In some cities, the improvement in air quality was quite dramatic. In Portland, Oregon, for example, the number of days in which air quality was considered

"If the Bill of Rights contains no guarantee that a citizen shall be secure against lethal poisons, it is surely only because our forefathers could conceive of no such problem. The public is being asked to assume the risks. The public must decide whether it wishes to continue on the present road."

— Rachel Carson,
Silent Spring

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DOUBLE, DOUBLE TOIL AND TROUBLE;
FIRE BURN AND CAULDRON BUBBLE.
TOXIC WASTE AND PCBs
BRING ON SUFFERING AND DISEASE;
ACID RAIN AND NUCLEAR SPILLS
INFECT ALL WITH ASSORTED ILLS.
LEACH INTO THE LAKE AND RIVER,
POISON BOTH THE LUNG AND LIVER.
SPREAD THIS WASTE
UPON THE LAND
INTO THE FLESH
OF CHILD AND MAN.
BY THE DAMAGE
MAN HAS DONE,
SOMETHING WICKED
THIS WAY COMES.
STEIN '81
ROCKY MTN. NEWS · NEA

Credit: Courtesy of *Rocky Mountain News*

unhealthy declined from 250 in 1973 to 70 in 1978.

While the nation's water was not improving at the same rapid rate as its air, the water quality in many lakes and streams was getting better. By 1980, fish that had not been seen in years were returning to the Potomac, the Hudson, and other rivers that had been seriously polluted.

Hazardous Wastes

As progress has been made on air and water quality, attention has turned to other environmental threats. The symbols of environmental concern have changed — from oil-soaked seagulls and cities wrapped in industrial smog to Love Canal and Times Beach. Today, there is growing public apprehension about other pollutants and particularly about hazardous substances. The dangers resulting from spills, leaky landfills, and illegal dumping are both staggering and unknown. Some of the most difficult choices this nation faces on environmental protection are now posed by hazardous wastes. By focusing on hazardous wastes, as we will throughout this issue book, we can explore some of the choices posed by a variety of pollutants.

What, exactly, are hazardous wastes? They are the by-products of much of what we consume, the substances we use to keep our cars running, to paint our houses, to keep our food from spoiling. Over the past 40 years, the chemical industry has expanded enormously. DuPont's slogan — "better things for better living through chemistry" — became the nation's. A large market developed for products that were virtually unknown before the Second World War, including new pesticides, solvents, and industrial cleaners. Plastic products ranging from table utensils, sandwich wraps, and disposable diapers to plastic tubing and industrial valves are now a part of our everyday lives. In the words of one analyst of the chemical industry, Michael Brown, "Chemicals pervade our lives. We brush our teeth with fluoride compounds, rub on propylene glycol deodorants, clothe ourselves in rayon and nylon, talk on plastic phones, walk on synthetic tiles, live in rooms whose walls are coated with chemical-laden paints."

The problem is that as a by-product of their manufacture the chemical industry generates a great many hazardous wastes, about 70 percent of all such wastes. The rest of those wastes come from paper mills and textile firms, leather tanneries and electroplaters.

The EPA defines as hazardous any substance that is ignitable, corrosive, reactive, or toxic — which is to say any waste that if improperly disposed of "poses a substantial hazard to human health or the environment." The *Code of Federal Regulations* contains a two-and-a-half page list of hazardous substances, including carbon tetrachloride, a solvent (and a suspected carcinogen); Curene 442 and Vinyl Chloride, both used in the plastic industry (and suspected to be carcinogens); DDT and C-56, insect killers (both acutely toxic); and such substances as lead and mercury which have various uses (and are also toxic).

Although a precise calculation of the amount of hazardous wastes produced each year is difficult to make, it is estimated

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that almost 300 million tons of hazardous waste pour out of American factories each year — an amount equivalent to what would be required to fill the New Orleans Superdome from floor to ceiling once a day

A Legacy of Neglect

Where do those wastes go? For years, many industries were quite casual about disposing of their by-products. Dumping, rather than waste management, was the order of the day. Wastes were disposed of in ponds, underground wells, abandoned mine shafts, or they were simply dumped in municipal landfills. "Until recently," as Representative Albert Gore wrote in a 1980 Congressional Report, "land was perceived to be an awesome sponge, a resilient reservoir which would readily absorb any chemical concoction that man could brew."

After years of assuming that undesirable wastes could simply be thrown away, it has become increasingly clear that barrels eventually begin to leak, that chemicals that were out of sight and mind are now seeping into the water and our food, affecting the environment and our health in unsuspected ways. The EPA reports that 90 percent of the hazardous wastes produced are not disposed of properly, and that as a result of past neglect there are at least 22,000 potentially dangerous chemical dump sites scattered across the country.

The evidence of that neglect has become tragically obvious in dozens of communities. In Woburn, Massachusetts, for example, 11 children who lived within a half mile of wells that were condemned in 1979 because of chemical contamination developed leukemia within a few years. In California's Silicon Valley, residents of a tree-lined development called Los Paseos noticed what seemed to be an unusual number of birth defects, which were later attributed to chemical cleaning solvents that seeped into local wells from the tank of a nearby electronics firm.

In what became the most widely publicized instance of chemical contamination, residents of a neighborhood near Niagara Falls started to report not only strange odors and oozing chemicals in their basements, but also rashes, allergies, and an unusually high incidence of serious illness. Love Canal, which was finally evacuated and declared a disaster area, drew the nation's attention to hazardous wastes.

New Hazards, Harder Choices

Having achieved some success in reducing air and water pollution, the nation now faces more subtle and insidious hazards. The "easy moves" in combating environmental pollution — efforts to contain the most visible forms of pollution — have already been taken. The choices facing us now are harder ones, for several reasons. The experience of the past few years indicates how costly it is going to be to implement the goals implied in the major pieces of environmental legislation. Pol-

The EPA's Protective Umbrella

Established in 1970, the Environmental Protection Agency consolidated the federal government's program against pollution of the air, water, and land. Its main responsibilities fall into five categories.

Protecting Air Quality

The Clean Air Act of 1970 (amended in 1977) establishes emission standards for cars and factories. The act establishes specific goals for different areas of the country.

Protecting Water Quality

The Water Pollution Control Act of 1972 was designed to control discharges into rivers, lakes, and the ocean. It requires permits for discharges into the ocean and fines of up to $50,000 for dumping hazardous substances into the water

Protection Against Pesticides

The Federal Insecticide, Fungicide and Rodenticide Act of 1947 (FIFRA) (updated in 1972 and 1978), requires that pesticides be registered, appropriately labeled, and properly used. EPA is empowered to ban, cancel, or suspend the use of pesticides under FIFRA.

Regulating Potentially Hazardous Substances

The Toxic Substance Control Act of 1976 (TSCA) regulates new potentially hazardous substances and requires chemical manufacturers to research the possible health and environmental effects of proposed products.

Protection Against New Industrial Wastes

In an effort to prevent the creation of new hazardous dump sites, Congress passed the Resource Conservation and Recovery Act of 1976 (RCRA). This act established a list of hazardous wastes and requires companies generating these wastes to label them and dispose of them only through licensed facilities. EPA issues permits to transporters, recyclers, and storage facilities which handle these special wastes.

Protection Against Chemical Waste Dumps

Through the creation of the "superfund," part of the Comprehensive Environmental Response, Compensation of Liability Act of 1980 (CERCLA), Congress gave EPA the power and money to begin cleaning up old waste sites like Love Canal. EPA also has the power, when it can find a responsible party, to bring suits against companies to recover the cost of cleaning up sites.

lutants such as hazardous wastes pose a particularly difficult problem because — unlike air and water pollution — there is much disagreement about their health and environmental effects, and about what levels of exposure are potentially harmful. Highly sophisticated scientific tools have been developed to detect the presence of even very small amounts of substances such as dioxin. The problem is that, once those substances are detected, there is little agree nent about how much dioxin must be present before it poses a danger.

If the activism of the 1960s and 1970s represented a first wave of environmental concern, we are today at quite a different point in the debate over pollutants and protection. Early debates about the environment were often splintered between those who considered themselves "for" the environment, and those who were perceived as "against" it. It is easy to point the finger of blame for environmental pollution at business and industry, and to insist that they must take steps to clean it up. But all of us — consumers and producers alike — are responsible for pollution, and we will have to act together if we want something done about it.

Whereas the environmental debates of a few years ago typically proceeded as if the choice were between pollution and no pollution, today's environmental debate focuses more realistically and fruitfully on the trade-offs required to achieve higher environmental standards. It costs something to have a clean environment, just as it costs something to have the other goods we want. If we want a cleaner environment we will have to pay for it, directly or indirectly, as consumers or taxpayers. The gains from raising environmental standards need to be balanced against their costs.

Public debate about pollution and protection is particularly important now because Congress will be making an unusual number of decisions about environmental policy over the next two years. It will be reexamining and reauthorizing a series of environmental laws — on such matters as clean air, clean water, and the regulation of insecticides. It will be particularly concerned with hazardous wastes because three related decisions have to be made: about the reauthorization of the Resource Conservation and Recovery Act (RCRA), the law designed to halt the irresponsible storage and disposal of hazardous wastes; about the "superfund," the fund designed to pay for cleaning up hazardous waste dump sites; and about compensating victims who claim to be harmed by chemical hazards.

To some extent, congressiona debates will address technical matters such as the importance of pretreating industrial wastes that are discharged into municipal sewers. These technical questions about how best to achieve certain goals are less important matters for citizens to understand and debate than the underlying questions about what we should be doing. Our purpose in this issue book is to lay out three choices on environmental protection, to explain their significance, and to present different points of view on each of them.

Which Risks Are Acceptable?

The first of these three choices arises out of the recognition that there are degrees of risk and degrees of safety. People disagree about what is hazardous, and about the meaning of "adequate" protection. While the definition of what constitutes a significant or a negligible risk is crucially important in discussions about the environment, determining what is acceptable and what is intolerable is a judgment that we must make. Scientists can tell us something about the likelihood and the severity of the risk posed by particular substances, but they cannot tell us whether that is acceptable. This is not an arcane debate over scientific evidence but a fundamental policy choice.

There is no real argument about the desirability of protecting the environment. But there are definite differences about where we should draw the line, how cautious we should be in defining environmental standards. Before deciding where that line should be drawn, we need to balance the risks posed by particular substances against their benefits.

We could draw the line on safety standards at either of two quite different positions. Some people feel that, considering the potential hazards posed by many chemicals, we must choose as a nation to be extremely cautious, and to put tight constraints on the production of any substance that generates dangerous by-products. We could decide as a matter of national policy that unless manufacturers (and the Environmental Protection Agency) are able to determine confidently that a substance and its by-products are safe, that they should be considered hazardous. People who take this position point out that while the links between some environmental hazards and disease are not entirely clear today, they may become tragically obvious tomorrow.

Others reply that it is unrealistic to try to eliminate all risks. Certain risks are the price we pay for living in a technologically advanced society. Testing requirements already pose an enormous burden on industry. If we go any further, innovation may be stifled. Besides, the advantages of such substances as pesticides — to take just one example from the thousands of products we take for granted — far outweigh the potentially hazardous by-products.

The positions on where we should draw the line on safety standards are clearly defined, and clearly different. These are the positions that we shall examine regarding the first of our choices.

Who Should Be Responsible?

There is a second issue regarding environmental protection, one that members of Congress have been debating as they consider changes in the "superfund." It is estimated that there are some 22,000 potentially hazardous dump sites across the country that may pose a serious threat to public health. Cleanup efforts are

proceeding with money from the "superfund" — a fund largely paid for by industries that generate hazardous by-products. As things currently stand, individuals who feel that they have been harmed by chemical contamination have a right to sue within their own states for compensation but prompt compensation is by no means assured.

As we deal with the legacy of hazardous dump sites, one choice is to proceed on our current path. Some people feel that current cleanup efforts are, if not entirely satisfactory, the best that we can do. And they feel that individuals who may have been harmed by chemical contamination already have a legal mechanism for seeking damages.

Others feel strongly that what we have been doing is not sufficient. They advocate a more aggressive cleanup campaign, and a much larger "superfund," even if it imposes greater costs on manufacturers and taxpayers. They feel, too, that new procedures should be devised to compensate individuals harmed by hazardous wastes, even if those expanded rights to compensation prove to be quite costly to American industries.

What is at issue here is who should be responsible for bearing the burden of that legacy of hazardous wastes which is buried in dump sites across the country.

What Should We Do with It?

If our second choice involves assigning responsibility for what was done in the past, our third choice has to do with the hazardous wastes we produce from now on, which is quite a different matter. Although people are now well aware of the potential hazards of chemical wastes, huge amounts of these by-products are still produced. The problem is that there is no consensus about what should be done with them, or whether new efforts must be made to reduce the amount of such waste that is produced.

Landfills provide the cheapest way to dispose of hazardous wastes. In the absence of incentives to use any other method most industries will probably continue to use this expedient, even though its virtue — the fact that it is relatively inexpensive — may translate over time into high costs and health hazards.

If we continue to put hazardous chemicals into the ground, we may be inviting future Love Canals. An alternative is to insist that industries choose safer disposal or treatment techniques. But more careful management costs money. If industries were required to use other disposal or treatment methods, the price of their products would be higher, and additional production costs might deter further innovation or investment in those industries.

A third alternative is to take decisive steps to reduce the quantities of dangerous by-products, even if that requires substantial changes in our consumption patterns. This is a more fundamental solution that would attack the problem at its source. Environmental hazards could be minimized if manufacturers

Credit: © Franken/Sygma

Protected by a mask and rubber clothing, an investigator samples the soil in Times Beach, Missouri, to determine if it is contaminated with dioxin.

substituted safer materials, used fewer chemicals to retard spoilage, and so forth. The question is which conveniences we would be willing to forego in exchange for a safer environment. So this third choice forces us to confront a fundamental question about what we owe to the future. Do current consumption and waste disposal practices jeopardize the health and safety of future generations?

With regard to the gross national by-product, as with other pressing issues, there is no easy solution, no "technological fix." The choices that need to be made force us to clarify not only what we want, but also what we are willing to give up in order to achieve higher environmental standards. In particular, these decisions force us to ask what limits should be placed on the pursuit of self-interest in order to define an environmental policy that responds to the public interest.

So we turn to the first of our three choices. What is at issue in many discussions of the waste disposal practices of particular industries, or the record of the Environmental Protection Agency in protecting the environment is a question which we all face in our daily lives: which risks can we live with — even if we'd prefer not to? How cautious should we be? That is where our discussion of choices about environmental protection begins.

2

Acceptable Risks, Unacceptable Hazards

> **"What is at issue in the debate over the environment are some basic questions which — in a slightly different form — we face in our daily lives. Which risks can we live with, even if we'd prefer not to?"**

Few headlines are so perplexing and alarming as those that announce yet another environmental hazard — whether it involves the food we eat, the water we drink, the air we breathe, or hazards posed by leaks from industrial tins buried behind a nearby factory. Such announcements are upsetting because they suggest that there may be a great many more environmental hazards than we expected. Moreover, the items on that list seem to be constantly changing. Substances that were used until recently, such as cyclamates — formerly the principal artificial sweetener in millions of diet drinks — are banned because of suspicions that they may cause cancer.

It seems that as we increase our efforts in environmental protection, more and more potential threats to our health and safety are discovered. Almost daily, we are confronted with new claims that some common substance may be hazardous. Many of those announcements amount to little more than fearmongering. Some of them carry an overtone of dread out of all proportion to the real risk posed to society by a particular substance. Other newly identified hazards, however, pose a real danger and demand immediate action. The problem is distinguishing between real and imaginary threats. In the words of biochemist William Lowrance, "We hardly know which cries of 'wolf' to respond to. But we dare not forget that even in the fairy tale, the wolf really did come."

Prolific Pests

We are faced quite often with contending claims about environmental hazards. Consider, for example, what happened in California in July 1981. News stories carried accounts of an angry demonstration in Sacramento, the state capital. Demonstrators demanded that Governor Jerry Brown not allow aerial spraying of a chemical pesticide called malathion to kill the Mediterranean fruit fly, which threatened the state's agricultural industry. Many people were alarmed that the state was even considering aerial spraying of what they regarded as a dangerous, potentially cancer-causing chemical. Precautionary notices that instructed people living in the affected areas to take such measures as closing their windows and washing children's toys after the spraying only heightened fears about malathion.

Yet the state's farmers insisted that the Medfly infestation was quite serious, and that immediate action was necessary. First discovered in fruit trees in the Santa Clara Valley, the Medfly was soon found as well in the lush San Joaquin Valley, the heart of California's agricultural industry. If not controlled, the Medfly threatened to wipe out entire crops and to inflict a devastating loss on some 400,000 people in the state's agricultural industry. Other measures taken to control this prolific pest, such as ground spraying, had been ineffective. It looked as if the only alternative was aerial spraying of thousands of acres of California cropland. By midsummer, demands for additional measures against the Medfly intensified. Under pressure to pro-

Credit: Courtesy of *Rocky Mountain News*

tect other states from a similar infestation. U.S. Secretary of Agriculture John R. Block threatened to quarantine California produce if the Medfly was not brought under control.

From the farmers' point of view, there was no reason *not* to use malathion, which had proved effective in controlling various pests, and is safer than a crop fumigant known as ethylene dibromide which might have had to be used if the Medfly invasion spread. To most of the farmers, aerial spraying of malathion posed no greater risk than numerous pesticides that had been used for years, pesticides that deserve much of the credit for the impressive productivity of American agriculture. Without pesticides, crop production would drop substantially and prices of agricultural goods would be higher. The farmers wanted protection both from the Medfly invasion and from financial ruin, and they were convinced that malathion would provide that protection.

Yet the opponents of aerial spraying made what appeared to be a convincing case. They objected that it would threaten the state's residents in three ways: by inhalation, skin contact, and through contamination of water supplies. They insisted that it would lead to severe health problems, and got experts to speak out against it. Dr. Sumner Kalman, a professor of pharmacology at the Stanford University School of Medicine, testified that aerial spraying posed an imminent danger to public health and a special danger to newborns. Kalman concluded that "as more studies are done, malathion will be proven to be cancer-causing."

But other experts, such as Dr. Ephraim Kahn, chief of the epidemiological studies section of the California Department of Health Services, came to quite a different conclusion. Kahn said that Kalman's testimony, and that of other experts who spoke out against aerial spraying, represented "very poor science and a strictly alarmist position." His office issued a report to California residents indicating that aerial spraying of malathion would *not* be harmful to the state's residents.

So the experts disagreed with each other and the public was polarized. The state's farmers felt that there was a grave threat to their crops and their livelihood, and saw no reason to refrain from using a pesticide that seemed to pose no special hazard. Speaking on behalf of a group called the Consumer Coalition for Health, Jay Feldman said that in the face of such scientific disagreement about pesticides, people should "realize

"There is no real argument about the desirability of protecting the environment. But there are definite differences about where we should draw the line, how cautious we should be in defining environmental standards."

Credit: Elbe *Frankfurter Rundschau*, Frankfurt, Germany

At issue in California was whether, considering the risks posed by the Medfly, it was necessary to resort to the use of pesticides to protect agricultural products.

that the burden is on the public to prove that aerial spraying would pose a health problem." From the point of view of the advocates of aerial spraying, its benefits would far outweigh any slight additional risk that might be posed.

But the opponents of malathion took quite a different position. In light of its potentially grave effects, especially the possibility that it might cause cancer, they concluded that the only prudent course would be to assume that it is hazardous until it is clearly established that it is not — and to call off the aerial spraying.

Finally, however, Governor Brown approved the aerial spraying and the Medfly invasion was brought under control. But the debate continued about whether malathion posed an unacceptable risk.

Different Judgments on Safety

The bitter conflict that took place in California illustrates the tension between two opposing positions on environmental protection. Neither side dismisses the importance of environmental protection. But each side makes a different judgment about safety. Whether the topic is pesticides, water pollution, acid rain, or groundwater contamination, the basic question is where we should draw the line on safety standards.

Deciding where to draw that line is one of the basic responsibilities of the Environmental Protection Agency. When Congress drew up the Resource Conservation and Recovery Act of 1976, for example, it instructed the EPA to act when there is an "imminent threat to public health." The Toxic Substances Control Act directs the EPA to prevent "unreasonable risks" to health. In its section on hazardous pollutants, the Clean Air Act directs the agency to provide "an ample margin of safety."

In certain cases, Congress has specified which chemicals are to be regarded as toxic. One section of the Clean Water Act, for example, contains a list of water toxics. Generally, however, the EPA is left to decide how much risk to allow, and where public safety standards should be set. It is responsible, among other things, for determining which chemicals should be on its hazardous substances list, and which everyday products such as paint should be considered dangerous when discarded.

Decisions about which substances will be considered hazardous, and which among them pose the greatest threat, are fundamental to the entire environmental protection effort. With the assistance of its Science Advisory Board, the EPA is constantly conducting studies to determine how much of a risk certain substances pose. This year, for example, the EPA is developing criteria to determine cleanup standards for hazardous dump sites. It is reevaluating air quality criteria for ozone and lead. It is defining new guidelines for land-disposal facilities. And it is conducting risk assessments on several dozen chemical substances. Of all the decisions made by public policymakers, few affect us so directly as decisions about what

constitutes an environmental hazard, and few are so controversial.

In the words of EPA Administrator William Ruckelshaus, "The public thinks we know what all the bad pollutants are, precisely what adverse health or environmental effects they cause, how to measure them and control them absolutely. We do know a great deal about some pollutants, and have controlled them effectively. If this were the case for all pollutants, we could breathe more easily — in both senses of the phrase."

The Testimony of Scientists

Why is it so difficult to identify environmental hazards? As illustrated by the Medfly incident, when questions arise about environmental decisions, people commonly turn to scientists, who are called in to testify about which risks pose a hazard, and which can be safely disregarded. Scientists are called upon to help make decisions about the safety of everything from X rays and auto emissions to food additives and pesticides. Their testimony is important because many hazards are not intuitively obvious. We can perceive that smoke, which is visible and smelly, is an air pollutant. We need the help of scientists to determine that nitrous oxide — which is odorless and generally invisible — poses a real danger, too.

By specifying the nature of a particular hazard, its severity and its probability, scientists can often help us to compare risks, and thus to determine which ones deserve the most urgent attention. With regard to a substance such as phosphorous, which is contained in some fertilizers and detergents, scientists played a major role in determining how it endangers lakes and rivers by accelerating the growth of algae and weeds, thus depleting the supply of oxygen. They played a similarly important role in explaining why carbon monoxide endangers people's health, which led to stricter regulations to reduce carbon monoxide poisoning.

With regard to many substances, however, the scientific evidence does not lead to a clear determination of what is safe. That is the reason why experts who were called in to testify on the effects of aerial spraying of malathion gave different answers.

Studies of the effect of malathion on laboratory animals provided circumstantial evidence that it might cause mutations, allergic reactions, or cancer. Those studies were the basis for expert warnings that the spraying of malathion might seriously endanger the public's health. But the California Department of Health Services issued a report that came to the opposite conclusion. "We find after careful, in-depth evaluation," the report said, "that there will be no significant health risk" from the spraying of malathion.

Opponents of aerial spraying suspected that the report had been influenced by political pressures. In fact, it represented nothing more than a different interpretation of the meaning of inconclusive evidence. In assessing studies of suspected cancer-

Commercial Testing to Provide Safe Products

Elixir Sulfanilamide appeared on drugstore shelves over 40 years ago. Available without prescription, this medicine was a mixture of a popular sulfa drug and diethylene glycol, a solvent used in brake fluid and antifreeze. Since safety tests were not legally required in 1937, none were performed on Elixir. Ninety-seven pints of Elixir were consumed and 107 people died because of it.

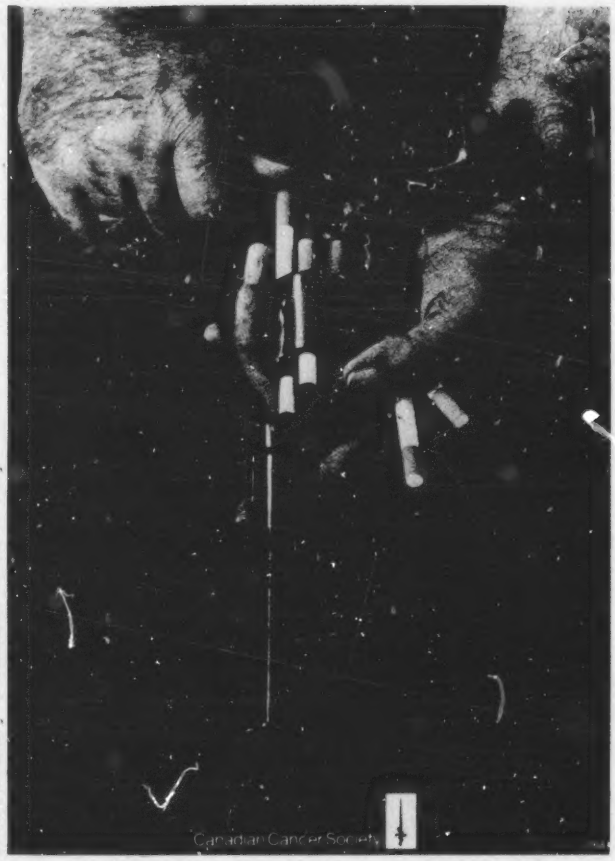
Today, because of new federal regulations and testing requirements it is highly unlikely that a product such as Elixir would reach local drugstores. There are now testing requirements not only for drugs, but also for food, children's toys, pesticides, and a host of other products.

In the case of pesticides, these safety regulations are one reason why it takes so long to register new agricultural chemicals. It commonly takes as long as ten years from the time initial product research begins to the point where a new product is available for use. During that period of testing and preparation a company may investigate and reject as either unsafe or ineffective thousands of different formulations.

In order to satisfy EPA requirements for the registration of a new pesticide, manufacturers subject new products to five stages of testing:

* Primary screening takes place in laboratories where various chemical compounds are synthesized and tested to see if they are safe and useful.
* Secondary screening involves testing these synthesized compounds to develop appropriate application amounts and techniques. This takes place in greenhouses or on small outdoor research plots.
* Field testing is conducted to examine the effect of pesticides in realistic environments — on specific crops, in different soils, and under different weather conditions.
* Toxicity tests on animals are used to detect the possibility of long- or short-term health effects such as cancer, mutation, or birth defects.
* Finally, the small fraction of chemicals which make it through the four previous tests are examined to determine what residues, if any, they leave on crops that may be dangerous for consumers.

Once completed, the results of these tests are sent to EPA in registration packages. To ensure that the testing is conducted properly, EPA sometimes inspects company laboratories. The agency then analyzes the test results, performs additional tests if they are needed and eventually decides whether or not the new product can be used safely.



Credit: Courtesy of Canadian Cancer Society

The fact that so many people continue smoking, despite health warnings, is an indication that individuals willingly take substantial risks with their health.

causing agents on laboratory animals, and reaching a conclusion about their implications for the safety of humans, there are uncertainties at every step. At high doses, malathion causes tumors in lab animals. But what does this tell us about the likely impact of the much lower doses to which the residents of the San Joaquin Valley were exposed? Can we assume that substances which affect lab animals in a particular way have a similar effect on humans?

To these crucial questions, scientists give different answers. The fact that malathion was finally sprayed over thousands of acres in California did not conclusively prove either side's contentions. After spraying took place, some residents attributed various medical symptoms to it, and submitted claims to the state in excess of one billion dollars for compensation. The problem is that reactions to malathion, like most potentially hazardous substances, mimic other medical problems such as the flu, so it is difficult to say whether they were caused by exposure to the pesticide. Furthermore, chronic symptoms of exposure to hazardous wastes may not appear for many months, or even years. The only damage that could be clearly attributed to the spraying of malathion was damage to the finish of thousands of cars.

As much as we would like scientists to be able to tell us which substances or conditions are hazardous and which are not, there is still great uncertainty about most environmental hazards. Nonetheless, decisions about which risks are acceptable and which are not have to be made. And that is why it is so important to try to achieve some consensus about how we should proceed in the face of uncertainty.

The debate about safety standards illuminates differing approaches toward risk itself, as well as different perceptions of the trade-offs required to achieve higher safety standards. What is at issue is whether most potential risks should be regarded as safe until the hazards are clearly demonstrated or whether they should be regarded as hazardous until they are proved to be safe.

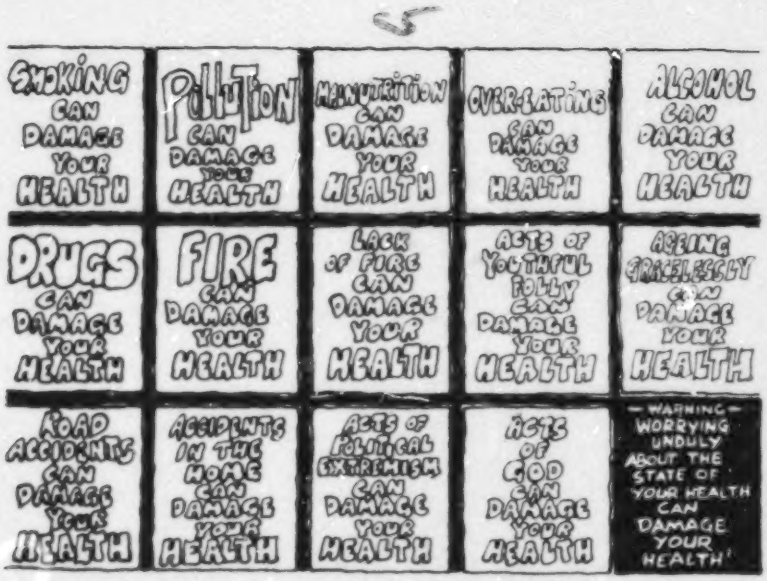
Some Risks Are Worth Taking

One answer to the question of where the line should be drawn on safety standards is illustrated by the approach of the Californians who advocated aerial spraying. From their perspective, certain risks are the price we pay for living in a technologically sophisticated world. Considering the benefits of literally thousands of technologies that we take for granted, those risks are worth taking. People who support this position do not advocate technology at all costs. Most of them agree that where there is clear evidence that a substance is hazardous, of course it should be banned. The question is how we should proceed with that long list of substances that *might* pose a hazard. Their concern is that if we consistently followed the rule "If in doubt—don't" innovation would be stifled and we would have to forego many of the benefits of science and technology.

The premise of the people who take this position is that while environmental protection is very important, it is not the only thing we value. We also want technological progress, a growing economy, and a business climate that attracts investors. To take a "zero risk" approach to public health by trying to eliminate all substances that pose a potential hazard is both expensive and unrealistic.

They point out that individuals willingly take risks, and substantial ones at that. The government, after all, permits visitors to Yosemite National Park to sky dive from El Capitan Mountain some 2,000 feet into the valley below. Many people choose to smoke cigarettes, despite the risk of cancer. And most people drive automobiles, despite the fact that some 60,000 Americans die in automobile accidents each year. Proponents of this position feel that it is inconsistent to go to great lengths to try to eliminate the risks associated with tail pipe emissions, while at the same time allowing people to accept the far greater risk of driving an automobile.

Considering that substances such as pesticides and haz-


SMOKING CAN DAMAGE YOUR HEALTH
POLLUTION CAN DAMAGE YOUR HEALTH
MALNUTRITION CAN DAMAGE YOUR HEALTH
OVER-EATING CAN DAMAGE YOUR HEALTH
ALCOHOL CAN DAMAGE YOUR HEALTH
DRUGS CAN DAMAGE YOUR HEALTH
FIRE CAN DAMAGE YOUR HEALTH
LACK OF FIRE CAN DAMAGE YOUR HEALTH
ACTS OF YOUTHFUL FOLLY CAN DAMAGE YOUR HEALTH
AGEING GRACELESSLY CAN DAMAGE YOUR HEALTH
ROAD ACCIDENTS CAN DAMAGE YOUR HEALTH
ACCIDENTS IN THE HOME CAN DAMAGE YOUR HEALTH
ACTS OF POLITICAL EXTREMISM CAN DAMAGE YOUR HEALTH
ACTS OF GOD CAN DAMAGE YOUR HEALTH
— WARNING — WORRYING UNDULY ABOUT THE STATE OF YOUR HEALTH CAN DAMAGE YOUR HEALTH!

Credit: Jensen, *The Spectator*/London, England

ardous wastes are associated with the diseases we fear most — cancer and reproductive disorders such as birth defects — it is understandable that people are so fearful of them. But it may be unreasonable to try to ban all agents that might be cancer-causing. In fact, as the advocates of this position point out, the evidence on cancer-causing substances is pretty slim. Only about two dozen chemicals have been definitely linked to human cancer through epidemiological studies — those that examine the prevalence of particular diseases in an entire population. And chemicals are not the main cause of cancer. In the words of political analyst Kevin Phillips, "It is time for the carcinogen Luddites who would like to regulate or dismantle every substance which is even distantly linked to cancer in a laboratory animal to wake up to reality. Nature and heredity produce a good deal more cancer than cyclamates and chemical poisons."

Indeed, if the government tried to protect us against every potential health hazard, environmental regulations would no doubt become far more extensive than they are today. To take one recent example, the EPA is considering a proposal to limit the power of radio transmitters because of concern that exposure to the radiation emitted by such towers poses a health hazard. Such regulatory efforts indicate to many people that the government is simply going too far in its attempt to protect us against environmental hazards.

The people who take this position conclude that while environmental protection is important, we need to be realistic in determining which risks are acceptable. In those numerous instances where there is no more than the suspicion of health or safety hazards, we cannot afford to stop and wait for conclusive evidence that it is safe to proceed.

Better Safe than Sorry

As illustrated by the position taken by the people who opposed aerial spraying in California, others give quite a different answer to the question of where we should draw the line on safety. In their view, it is irrelevant whether individuals choose to take great risks. That, after all, is their right. What we choose to do as a society is another matter entirely. Decisions about such matters as spraying insecticides or setting standards for the disposal of hazardous wastes affect everyone in the society. For that reason, we have to err on the side of caution when there is uncertainty.

People who take a conservative position on this issue insist that it is better to be safe than sorry. They recall that one substance after another has been assumed to be safe, only to be banned subsequently when evidence of its harmful effects became clear. It took decades of research to establish the link between smoking and lung cancer. If in general we wait for scientific proof before taking regulatory action, we will have waited too long.

Finally, for the people who take this more conservative position on environmental standards, it is an ethical matter. They believe that two criteria should be applied when making decisions about which risks are acceptable. No risk should be taken when the quality of life of future generations might be jeopardized. And no risk should be taken when irreversible damage to the environment might result. They feel that the people who propose measures such as the aerial spraying of malathion must be obliged beforehand to prove that they are safe.

No matter which of these positions you choose, one thing is clear. As much as we would prefer to have the assurance of absolute safety with absolute certainty, decisions have to be made in areas of great uncertainty about which risks we will accept as a society. Determining which risks are acceptable is not a technical decision that scientists can make for us, but a political decision that we must make for ourselves.

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3

Assigning Responsibility for a Legacy of Neglect

> **"Aware now that there are thousands of potential Love Canal sites across the country, we are beginning to realize what it will cost to clean up abandoned dump sites. Choices need to be made about who should bear those costs, and how individuals should be compensated for damages."**

In the 1970s, a series of events at Love Canal, in suburban Niagara Falls, New York, drew attention to the issue of hazardous wastes. Built at the turn of the century by developer William T. Love as a means of transportation for a model community that was never constructed, Love Canal has become an emblem of the devastating effect of haphazard waste disposal.

The story began in the 1940s, when the Hooker Chemicals and Plastics Corporation started dumping some 22,000 tons of chemical wastes into the canal, and burying other toxic materials nearby. In 1953, Hooker turned the site over to the local board of education, which filled the ditch and constructed a school on the property. Despite clearly visible pools of chemical contamination, families who moved into the area were pleased that the field next to the new school provided a recreation area for their children.

But the children who played there sometimes came home with hard pimples on their bodies. Then more serious health symptoms began to appear. Residents of the area who had previously been healthy now had headaches, nervous disorders, or unexplainable seizures. An unusual number of respiratory problems were reported, especially among the people who lived closest to the canal, where the air smelled like moth balls and weed killer, and chemicals seeped into people's basements. Both people and their pets were troubled by rashes and skin lesions. Even worse was the unusually high incidence of birth defects. Infants were born with extra fingers and toes; one child was born with two sets of teeth. It got so bad, as one resident of the community later told a Senate subcommittee, that when a child was born people didn't ask "Is it a boy or a girl?" but rather "Is it normal?"

When the results of a state-conducted health study of the area and its residents were released in May 1978, it became clear just how abnormal the situation was. There was evidence that more than 80 chemical compounds had been discarded in the area, including benzene, chloroform, and substances containing both PCBs and dioxin. The health inventory showed that residents of Love Canal were unusually prone to cancer, miscarriages, and an assortment of other afflictions.

In August 1978, the area was declared unsafe by the state. When Love Canal was designated a national disaster area soon after, the government stepped in to purchase the homes of hundreds of area residents, and help them relocate.

A Dangerous Legacy

Even before Love Canal was declared a disaster area there was enough concern about chemical residues to prompt Congress to pass the Resource Conservation and Recovery Act of 1976. That act gave the EPA the power to tell manufacturers how they should dispose of their waste materials. Another law passed in 1976, the Toxic Substances Control Act, required manufacturers to test potentially dangerous chemicals before they are

put on the market. Both laws would help to control additional hazardous wastes. But neither came to terms with the legacy of dangerous chemicals that have been oozing from under the nation's carpet.

Love Canal provided a shocking example of the magnitude of the problem facing the nation as it figures out what to do about the result of decades of neglect. But it was only one example among many. In the words of Eckhardt C. Beck, an EPA regional administrator in the 1970s, "We have learned that Love Canal was merely the first detonation of a string of chemical time bombs literally strewn across the nation." Today, it is estimated that some 22,000 abandoned waste dumps exist across the country. The EPA has compiled a "national priority list" of 546 sites that represent a particular threat to public health, and require quick remedial action.

Concern generated by the publicity about Love Canal was one of the chief reasons why, in 1980, Congress enacted a new law specifically designed to hasten the cleanup effort. The law provided a fund of $1.6 billion — a "superfund," financed largely through a tax on the petrochemical industry — with which the EPA could step in and take remedial actions where toxic wastes pose an imminent hazard to public health. The "superfund" is designated for use if no responsible party — the owners of a site, the transporters or generators of wastes — can be identified. When a responsible party can be identified, the EPA files suit to recover costs of waste removal or remediation. Under this kind of arrangement, the Occidental Petroleum Company — Hooker Chemical's parent company — agreed in 1982 to pay $15 million to cover part of the cost of cleaning up the Love Canal area, and in doing so resolved the first of four lawsuits brought against it by the EPA.

Credit: © Michel Philippot/Sygma

The Question of Compensation

But what about the individuals and families harmed by chemical wastes? Because of the hazards they had been exposed to, many of the residents at Love Canal had to pay large out-of-pocket medical expenses; some lost wages because of illness caused by toxic exposure. And the value of their property was reduced. All told, they experienced a great deal of pain and suffering — not to mention the mental anguish of not knowing what afflictions might show up in the future.

As things currently stand, the only way that people who feel they have been harmed by chemical dump sites can be compensated by the firms responsible for creating those hazards is to take them to court, which is what 1,400 Love Canal residents did when they filed suit against Hooker Chemical.

However, several obstacles confront anyone who seeks compensation in this way. The first is that victims must clearly establish that their injuries were directly caused by harmful chemicals, which is a difficult task because of the uncertain chain of causation between exposure to chemicals and the appearance of medical symptoms. The danger posed by hazardous chemicals depends upon the level of exposure, its duration, and the individual's state of health as well as the extent of exposure to other potentially dangerous substances. What the plaintiff has to prove is that a particular symptom such as cancer is not an act of God, but the direct result of negligence on the part of the company which discarded the chemical wastes.

The plaintiff also has to show that the company acted irresponsibly or illegally. In many such suits, the firm's response is that it should not be held responsible for a consequence that could not have been predicted when the chemicals were discarded.

A further complicating factor for individuals seeking compensation is that there is a statute of limitations that requires cases to be filed within a few years of the time the injury takes place. Yet the symptoms of toxic exposure often do not show up until years later. Individuals may not discover that they have suffered ill effects until long after the statute of limitations expires.

Where Are the "Superfund" Sites?

The EPA has completed cleanup efforts at six sites:

State	City or County	Name of Site
Georgia	Athens	Luminous Processes, Inc.
Maryland	Baltimore	Chemicals Metal Industry
Michigan	St. Louis	Gratiot County Golf Course
Mississippi	Greenville	Walcott Chemicals Warehouse
Ohio	Cleveland	Chemical Minerals
Pennsylvania	Pittston	Butler Tunnel

EPA's National Priorities List, compiled with the help of state environment officials, catalogues more than 500 of the nation's most dangerous hazardous waste sites. These are some of the sites that are particularly hazardous.

State	City or County	Name of Site
Alabama	Huntsville	Trianna/Tennessee River
Arizona	Globe	Mountain View Mobile Home Estates
California	Riverside	Stringfellow Acid Pits
Colorado	Boulder	Marshall Landfill
Delaware	New Castle	Tybouts Corners Landfill
Florida	Tampa	Reeves South East Galvanizing Company
Illinois	Waukegan	Outboard Marine Corporation
Indiana	Seymour	Seymour Recycling Corporation
Iowa	Council Bluffs	Aidex Corporation
Kansas	Arkansas City	Arkansas City Dump
Kentucky	Brooks	Valley Of The Drums
Louisiana	Darrow	Old Inger Oil Refinery
Maine	Gray	McKin Company
Massachusetts	New Bedford	New Bedford Harbor
Minnesota	St. Louis Park	Reilly Tar and Chemical Corporation
Mississippi	Flowood	Flowood
Missouri	Ellisville	Ellisville
Montana	Silverbow Creek	Silverbow/Deer Lodge
North Dakota	Southeastern	Arsenic Trioxide Site
New Hampshire	Nashua	Sylvester
New Jersey	Pleasantville	Price's Landfill
New Mexico	Albuquerque	South Valley
New York	Oswego	Pollution Abatement Services Corporation
North Carolina		210 miles of roadway
Ohio	Hamilton	Chem-Dyne Corporation
Oklahoma	Ottawa	Tar Creek
Pennsylvania	McAdoo	McAdoo Associates
Rhode Island	Coventry	Picillo
South Carolina	Columbia	SCRDI Bluff Road
South Dakota	Whitewood	Whitewood Creek
Tennessee	Memphis	North Hollywood Dump
Texas	La Marque	Motco Corporation
Utah	Salt Lake City	Rose Park Sludge Pit
Vermont	Burlington	Pine Street Canal
Virginia	Roanoke	Mathew's Electroplating
West Virginia	Point Pleasant	West Virginia Ordnance

Due to these factors, and to the time and expense of litigation, successful prosecution for damages caused by exposure to hazardous wastes is an arduous and often unsuccessful process. As of the summer of 1984 — six years after Love Canal was declared a disaster area — no money had yet been paid by Hooker Chemical to settle the suits brought against it by former residents of the area. That is what concerns people who regard compensation for harm caused by toxic chemicals as a serious matter of social justice.

The question of which hazards in an industrial society should be borne by individuals, which by the parties responsible for creating the hazard, and which by the society as a whole. No one who experienced the anguish of the Love Canal residents could deny the human cost of exposure to toxic chemicals, which persuades some people that additional measures must be taken to prevent identical problems from occurring in the future. But there are strong arguments against changing the existing cleanup and compensation system. Let us examine these choices, and the arguments for and against them.

Credit: Alexander-Lawrence *Eagle-Tribune*

Victims and Their Rights

Many people feel that existing procedures for compensating victims of environmental pollution, such as the residents of Love Canal, are simply inadequate. Victims of environmental hazards were involuntarily exposed to substances about which they were uninformed, yet when they seek compensation for damages they face formidable barriers. There is substantial support for additional measures to ensure that individuals harmed by hazardous wastes are fairly compensated.

Some of the proposed measures would lower existing legal barriers. It has been proposed, for example, that the statute of limitations be changed in such cases, so that individuals exposed to hazardous wastes would have three years to file suit from the time when medical symptoms are first discovered, not — as is currently the case — from the time of exposure, which is often much earlier.

Another proposed change in legal procedures would shift the burden of proof from the person who claims injury, who currently has to show conclusively that exposure to chemicals caused medical problems. If this change were made, the plaintiff would be required only to show evidence that "tends to establish" a link between exposure and health effects. After that, the defendant — the company accused of dumping — would have to prove that exposure did *not* cause the illness. It is a subtle but important change that would make it easier for people who claim damages from chemical hazards to win their suits.

In addition to these legal changes, advocates of greater protection for those harmed by exposure to toxic substances feel that a trust fund for victims should be established, and that it should be financed mainly by the industries responsible for dangerous by-products. This is what is done in Japan, for ex-

"It's not right for people today to sit in judgment by today's standards on what manufacturers did 20 or 30 years ago. That's worse than Monday morning quarterbacking."

Michael Reichgut, Director of Public Relations, Occidental Petroleum

Credit: Courtesy of *Niagara Gazette*

Already alarmed by other dangerous chemicals found in Love Canal, the fears of local residents were heightened in 1978 when dioxin was discovered there.

ample, where individuals receive certain benefits when it is determined that their ailments are caused by pollution. Revenues for the program are raised by taxing the industries responsible for environmental hazards.

A similar system was proposed in this country when Congress devised the "superfund" in 1980. A version of the bill proposed by the Senate set aside one-third of the fund — whose costs are largely paid for by the chemical industry — to compensate victims for out-of-pocket medical expenses and lost wages. Many opposed the amendment at the time on the ground that the fund would quickly be bankrupt because so many individuals would demand benefits from it, and the amendment was finally deleted from the bill. To the advocates of expanded victims' rights, however, an industry-financed trust fund like this is a measure worth reconsidering. It would provide compensation far more quickly and reliably than the tortuous legal process that victims now have to go through.

A Flood of Litigation

Others have serious reservations about such proposals. They are concerned that measures intended to provide additional compensation might lead to spurious suits alleging damages caused by environmental pollutants. The Chemical Manufacturers Association has testified to Congress that in most cases where epidemiological studies have been conducted near waste disposal sites, the incidence of cancer is not unusually high. It is understandable that a person living in the vicinity of a factory that produces carcinogenic by-products who contracts cancer would tend to blame it on that firm. But cancer has many causes, and it is both inaccurate and unfair to blame it on any one factor — or chemical-producing factory.

That is why many people feel that existing legal procedures should not be changed. The underlying principle of the American legal system is that the defendant — in this instance the company charged with endangering people's health by dumping chemical by-products — is innocent until proved guilty. If, as some people are proposing, the burden of proof were changed to require companies to demonstrate that exposure to certain chemicals did *not* cause the illness, it might encourage people with unrelated medical problems to initiate suits against chemical companies.

Spokesmen for the chemical industry ask whether, in the name of ensuring victims' rights to compensation, we might be inviting a flood of litigation. If that happens, the main beneficiaries would very likely be lawyers and not the people harmed by exposure to chemical wastes.

By way of illustration they recall what has happened in

the asbestos industry. Over the past two decades, it has become increasingly clear that asbestos — an insulating material that was widely used because of its heat-resistant qualities — creates health hazards for those who breathe or swallow its fibers. As the medical evidence has accumulated, more and more claims have been made against manufacturers. It is estimated that there are currently some 20,000 outstanding court claims against the manufacturers of asbestos, and the average award for recently settled cases comes to more than $300,000. A group of nine former manufacturers of asbestos recently issued figures showing that for every $5 paid by the companies for settlements only $1 ended up in the hands of the people claiming damages. The rest of it went to attorneys for legal expenses.

Whether the money from those settlements goes to lawyers or victims, the sum of the claims against the manufacturers of asbestos is so staggeringly high that the Johns-Manville Company — formerly the leading manufacturer of asbestos — declared bankruptcy in 1983. That decision sent shudders through the chemical industry as people contemplated the impact of a wave of lawsuits on other manufacturers. And it left many individuals who had filed suit against Johns-Manville wondering whether they would receive any compensation.

When considering additional measures to provide compensation, one of the things to keep in mind is whether their actual effect is likely to correspond to their intention, and whether it is fair to impose a huge additional cost on certain industries — a cost that might push up the price of products, and discourage both investment and innovation.

Accelerating the Cleanup

Beyond the question of compensating individuals for damages caused by exposure to hazardous wastes, there is the broader question of whether the cleanup of toxic sites is proceeding fast enough. Critics contend that despite the "superfund," cleanup efforts have been proceeding very slowly. While the EPA has begun remedial action at many of the nation's 546 worst sites, it has so far completed cleanup activities at only six of those sites.

Meanwhile, there is increasing evidence of damage to people's health from the sites that remain. In San Jose, California, the rate of heart defects in infants born to mothers who drank water contaminated with trichloroethane is significantly higher than the nationwide rate. In rural Hardeman County, Tennessee, a significant number of people who drank chemically contaminated water have symptoms of liver damage. And scientists have determined that children in Michigan who have an unusually high level of polybrominated biphenyls (PBBs) in their fatty tissue have decreased intellectual capacity as a result. Because the toxic substances in the ground and the water supply pose a clear health hazard, critics insist that a thorough cleanup effort must be one of the nation's priorities.

"Beyond the question of compensating individuals for damages caused by exposure to hazardous wastes, there is the broader question of whether the cleanup of toxic sites is proceeding fast enough."

But what is a realistic price tag to put on the cleanup effort? When the "superfund" was first authorized, that was the question facing legislators who were given very different estimates of cleanup costs. One study done for the EPA estimated that cleaning up all of the priority sites such as Love Canal would cost anywhere from $3.6 billion to $44 billion, depending upon whether wastes were removed from the site or simply treated to make them safe. Other groups, such as the Council on Environmental Quality, estimated the cost of cleaning up the priority sites at a much higher level. In 1980, Congress decided on a "superfund" of $1.6 billion over a five-year period.

Because the "superfund" will expire in 1985, the question of how much money should be devoted to the cleanup effort has been raised once again. Critics of the cleanup effort are convinced that the fund should be reauthorized at a much higher level. Most of them feel that since industry was the main beneficiary of the cheap disposal practices of the past, it is appropriate to ask industry to continue to pay most of the cost of cleanup efforts.

Essentially, that is what the House Ways and Means Committee proposed in August 1984, when it recommended a "superfund" six times larger than the existing one — a "superfund"

that would provide the Environmental Protection Agency with more than ten billion dollars from 1985 to 1990 to clean up abandoned waste dumps. Roughly half of that amount would be paid from taxes on chemical manufacturers. The rest would be paid, in roughly equal measures, by a tax on crude oil and from general revenues — which is to say from our tax dollars.

A Costly Case of "Chemophobia"

Claiming that many people have developed "chemophobia" — an unreasonable fear of chemical substances — the chemical industry opposes a much larger "superfund," and argues that its costs exceed what is reasonable and necessary to protect the public's health. Even the opponents of an expanded "superfund" acknowledge that there were difficulties in getting cleanup efforts started a few years ago. But they feel that progress over the past few years indicates that the nation is coming to grips with that hazardous legacy. In each of the past few years, the EPA has taken more remedial actions than it did in the previous year. And the number of voluntary cleanup efforts on the part of the chemical industry is increasing quite rapidly.

The Monsanto Chemical Company, for example, has substantially expanded its environmental protection efforts. This year Monsanto will spend five million dollars for the cleanup of a dump site at its Delaware River plant in Bridgeport, New Jersey. The company's budget for waste site cleanup in 1984 is about $25 million, evidence of the company's commitment to reduce toxic hazards and its willingness to make such efforts without governmental coercion.

Spokesmen for the chemical industry point out that even at current levels the "superfund" imposes a heavy burden. Chemical firms have paid about $1.25 billion into the fund over the past five years. Just 12 companies paid almost 70 percent of that amount. And that is just a part of what industry pays for environmental protection. The "superfund" pays for cleanups only when no responsible party can be identified. Other funds are paid by chemical manufacturers who perform or pay for cleanup work directly. In addition to what they are paying for remedial work on dump sites, chemical firms—like most American industries — are paying quite a bit for other antipollution efforts, too.

In the words of a statement from the Chemical Manufacturers Association, "the chemical industry has been committing massive financial resources to the nation's waste site cleanup program. With our tax and liability payments that are certain to continue into the future, we hope that Congress recognizes that our industry is paying dearly for the 'superfund' program." Rather than imposing a much higher "superfund" tax — a tax almost four times higher than what the industry has been paying — as the House Ways and Means Committee has proposed, the Chemical Manufacturers Association argues that society as a whole should pay for the cleanup effort. After all, the public benefited from the relatively cheap products that were available in the past when industries were not obliged to spend so much on environmental protection efforts.

Most of the people who oppose a larger "superfund" believe that a more promising way to clean up the toxic legacy is to encourage voluntary cleanups. One such effort provides an example of an alternative model. A private, nonprofit group called Clean Sites is now at work providing assistance to companies in their efforts to clean up hazardous waste sites. The people who formed Clean Sites feel that antagonism toward the petrochemical industry has become counterproductive. The threat of prosecution by the EPA, and the damage to a company's public image that results from such prosecution, is enough to convince some firms to try to hide evidence of questionable waste disposal practices. What Clean Sites represents is a less adversarial effort toward the same goal. Its founders believe that companies should be encouraged to come forward to seek help in cleaning up waste sites. And that is what Clean Sites represents, a cooperative effort involving representatives of the chemical industry and groups such as the Conservation Foundation who work together on voluntary cleanup efforts.

Choices about the Cleanup Effort

Six years after the events at Love Canal that drew so much attention to the dangerous legacy of chemical wastes, this nation faces a choice about what should be done. The question is who should be responsible for cleanup costs, whether individuals harmed by exposure to those wastes deserve faster and more adequate compensation than they presently receive, and what priority should be attached to the cleanup effort.

One choice is to proceed on our current path. As we have seen, some people feel that it is unreasonable to commit much larger sums to the cleanup effort, and that it is unfair to the chemical industry to expect it to bear most of the financial burden. They particularly oppose measures that would shift the burden of proof in matters of compensation to the chemical industry, thus inviting a flood of litigation.

Others feel that the nation has still not learned the lesson of Love Canal, that the hazardous legacy of chemical wastes poses a real danger, and that the longer we wait to clean it up the greater that danger will be. To accomplish the cleanup, far more money must be available. And as long as individuals can demonstrate that they have been harmed by chemical hazards, they should be assured of prompt and adequate compensation. In order for that to happen, victims of toxic exposure need more clearly defined rights.

But cleaning up the chemical concoctions discarded in the past is only part of what has to be done to protect the environment. Huge amounts of these chemical by-products are still being produced. Deciding what to do about them poses a third set of choices, to which we now turn.

4

Deciding What To Do about the Wastes We Produce Today

> **"Almost 300 million tons of hazardous wastes are produced each year. But there is no consensus about where those wastes should go, or what should be done to reduce that amount."**

Since Love Canal, and other widely publicized examples of the hazards of industrial wastes, public awareness of the problem has increased quite rapidly. In fact, the fear of hazardous wastes has risen to the point where it is difficult to find a community that will accept a new storage facility. Across the country, there is strident opposition to the siting and construction of landfills, whether they are proposed by the state government or by private companies. While people feel strongly that wastes should be properly handled, they feel even more strongly that wastes shouldn't be disposed of in their own backyards. Partly because of public resistance to the siting of new facilities, states such as Tennessee — the ninth largest generator of hazardous wastes — have no licensed disposal or treatment facilities. The situation got so serious in Tennessee that a legislative committee proposed offering a reward of $500,000 to any community that would permit such a facility.

Those who propose new disposal facilities point out that they are not planning, and in any case would not be allowed to do anything so primitive as digging a hole and simply dumping hazardous wastes in it. Since the Resource Conservation and Recovery Act was passed in 1976, landfill operators have had to satisfy various requirements. To be considered secure, and to prevent chemicals from leaching into groundwaters, a landfill should have an impenetrable bottom. It should be capped to stop rain and surface water from leaching through the wastes. Furthermore, landfill operators must assume financial responsibility for up to ten million dollars in damages for any accident or damage associated with the site. And the landfill has to be monitored for 20 years to minimize wastes that may escape into the surrounding area.

However, despite assurances that landfills which meet those requirements are quite a different thing from the haphazard dumping which took place in the past, most people remain distrustful, and their skepticism translates into opposition to waste storage or treatment facilities.

Credit: Alexander-Lawrence *Eagle-Tribune*

"It isn't enough for citizens to say 'Not in my backyard.' We have to begin thinking about what should be done with hazardous wastes."

In Warren County, North Carolina, for example, 52 demonstrators recently went to jail because of their efforts to block delivery of soil tainted with PCBs to a state-run dumping site. When citizens in Wilsonville, Illinois, learned that wastes containing PCBs were being trucked into their area for burial at what was described by the site's operator, the Earthline Corporation, as a "model secure landfill," they voiced their opposition in the courts. Citizens saw no reason why their area should become a dumping ground for other people's wastes. Technical experts and state and federal environmental officials testified in favor of the Earthline Corporation and the precautions it was taking at the Wilsonville facility. But the court ruled in favor of the residents who initiated the suit. It ordered the landfill closed, on the grounds that it constituted a public nuisance. What the judge in that case didn't say was where the wastes *should* be taken.

Across the country, people are registering their concern about the inadequacy of past disposal practices by opposing new facilities. In a recent nationwide survey, 95 percent of the people polled said that if a landfill facility were proposed for their community, they would protest the proposed site or consider moving.

The problem is that almost 300 million tons of hazardous wastes will be generated by American industry this year, and it has to go somewhere. Like garbage cans, dump sites fill up after a while, and new ones have to be found. As existing landfills approach capacity the problem becomes critical. It is a problem that is unlikely to be solved until a consensus is reached about what should be done with hazardous wastes.

Firms that generate hazardous wastes have several options regarding those wastes. They can choose the inexpensive option of disposing of their wastes in landfills. They can choose the more costly alternative of treatment technologies to make them safer. Or they can attack the problem at its source oy restricting the production or use of toxic substances in the first place, by substituting safer materials in the production process, or recycling to extract usable materials from wastes.

The decision about which of these options represents the best way to manage hazardous wastes sounds like a technical decision. But the underlying issue is not a technical matter at all. It is a judgment about what represents a prudent balance between what is convenient and what is safe. We are faced as a nation with the question of whether more stringent hazardous waste disposal regulations should be required, even if they impose higher costs on producers and consumers. The fundamental question is how we should act as stewards of the environment, and what we should do to protect the health and safety of future generations.

So let us examine these three alternatives — the use of landfills, the use of more sophisticated containment and treatment technologies, and efforts to reduce the amount of hazardous wastes produced — and ask what each of these alternatives means in terms of cost, convenience, and potential long-term hazards.

The Landfill Option

Several years ago, the authors of a study prepared for a congressional subcommittee came to the conclusion that more than 90 percent of the hazardous wastes produced by the nation's 50 largest chemical firms over the past three decades had been disposed of in landfills. Until federal requirements were imposed in 1976, land disposal was typically a cheap and fairly simple matter. A hole was dug in the ground, and drums filled with chemicals were placed in it. The hole was then covered with clay, to keep rainwater out. But because clay is not a watertight medium, and many chemicals eventually corroded the drums in which they were placed, leaks often occurred.

New EPA regulations on landfills were issued in 1983 to make landfills more secure and those regulations also made landfills more costly. Even with those new requirements, however, landfills remain the cheapest means of disposing of hazardous wastes, and the most commonly used. Few incentives exist for industries to seek other disposal alternatives.

To many people, a policy that encourages firms to rely upon landfills is both shortsighted and dangerous. Critics of landfills regard them as inherently unsafe. They are, after all, a means of storing hazardous wastes, not a method of disposal. No matter what precautions are taken to provide more secure liners, it is likely that wastes will eventually leak through and migrate into the surrounding area and the groundwater.

In the eyes of their critics the strongest argument against landfills is that when leaks eventually occur the damage they cause is very costly, far more costly than it would have been to use better disposal and treatment methods in the first place. Where groundwater contamination is suspected, the cost of a thorough investigation can run as high as $200,000 and remedial actions cost far more. In the case of Love Canal, it has been estimated that proper disposal and treatment of wastes — according to current standards and practices — would have cost just $2 million. Compare that figure to the $36 million spent at Love Canal for remedial action through 1980, and to the eventual cleanup cost which will be higher still.

Furthermore, much of the burden of cleanup costs falls not on the firms responsible for dumping, but on the general public. Critics feel that it is safer and more equitable to use other waste disposal methods — methods that would impose more of the costs of managing hazardous wastes on the firms that generate the wastes, and on the consumers of hazardous waste-intensive products.

Credit: Jim Cornfield

Before cleanup efforts begin at waste sites, technicians must first determine what chemicals are present.

Alternative Treatment Methods

There are alternatives to landfills which offer more assurance of safety over the long run. Essentially, these alternatives fall into two categories — containment technologies that are more sophisticated than landfills, and treatment technologies that reduce the hazard.

The purpose of containment technologies that are safer and more sophisticated than landfills is to hold wastes so that hazardous substances are not released into the environment. The British, for example, have developed a method of mixing cement with liquid wastes that creates a permanent "prison" for toxic chemicals in concrete blocks that can safely be used as a foundation for highways. In this country, one of the most common containment technologies is the use of underground injection wells. Constructed like oil wells with steel and concrete casings to contain toxic fluids that are forced down the shafts, injection wells are used by thousands of American firms.

Treatment technologies offer another alternative. They reduce the hazard posed by wastes by changing their chemical composition. In West Germany, for example, most of the country's hazardous wastes are detoxified by treating them with chemical neutralizers. Another means of detoxifying organic compounds is to break them down into harmless gases by incineration. Like other treatment technologies, this method has the virtue of destroying hazardous wastes rather than providing a means of storing them.

One of the options, then, is to decide that it is too dangerous to dispose of hazardous wastes in landfills, to place severe restrictions on which substances can be disposed of in that way, and to encourage firms to pursue alternative treatment and containment technologies.

That is what the state of California has done. Recalling what happened at Love Canal and similar incidents of chemical contamination in California, officials in that state questioned the wisdom of continuing to rely upon landfills. In 1981, they decided to stop using land disposal facilities for hazardous wastes. As soon as treatment facilities are constructed, landfills will be used only for the disposal of material that does not endanger public health or the environment. Wastes containing pesticides, toxic metals, PCBs, cyanide, and other dangerous chemicals will from now on be banned from landfills.

As part of California's effort to reduce toxic hazards, state officials devised a series of incentives to encourage wider use of alternative disposal technologies. Higher fees were imposed on the land disposal of certain substances. And a waste ex-

change was organized to assist generators of hazardous wastes in finding recycling opportunities.

As a nation, we might follow California's example and sharply restrict the materials that can be dumped in landfills. Various incentives could be devised to encourage the use of alternative treatment methods. Although EPA officials have recently indicated that they are considering measures to discourage the land disposal of many toxic wastes and to encourage other methods such as high-temperature incineration and chemical treatment, there are not currently many incentives to American firms to use these alternatives.

Because some people are convinced that toxic chemicals in landfills pose a hazard that can no longer be ignored, the question of whether firms should be required to seek alternative disposal and treatment methods has become quite controversial. Critics of landfills feel that managers of American businesses who have to keep an eye on short-term profits are chronically shortsighted. If they are not required to shift to more costly waste treatment methods, it is highly unlikely that they will do so. These critics feel that the only way to protect our health and welfare and also that of future generations is to insist upon alternative means of disposing of dangerous chemicals.

"One of our options is to decide that landfills are simply too dangerous, and to encourage firms to pursue alternative treatment and containment technologies."

Yet to other people, a step in that direction represents another example of government's regulatory burden, and its interference with the marketplace. People who take this position feel that in the name of public safety, government has already imposed too many restrictions on the nation's businesses. Their main objection to alternative treatment methods is, quite simply, that they are more expensive. Even the incineration of hazardous wastes, which is not as expensive as other treatment techniques, costs about twice as much as burying the same chemical wastes in landfills.

Furthermore, as state and federal restrictions on waste disposal are made more stringent, it is entirely possible that more firms will resort to "midnight dumping." As waste generators and haulers try to skirt the problems posed by government restrictions on waste disposal, illegal dumping is already a growth industry. The methods of clandestine dumpers are often disarmingly simple. Some unload chemicals into dumps that are equipped to handle only household garbage. Truckers carrying hazardous liquids sometimes open their spigots as they drive down the highway. In one recent case, dangerous chemicals were mixed with fuel oil, which was used to heat apartment buildings in New York City. People opposed to further restrictions on what companies may do with their chemical by-products are convinced that further regulations would result in increased "midnight dumping" — and that would create a greater hazard to public health.

Waste Reduction

Because of their inadvertent effect of encouraging "midnight dumping," perhaps alternative treatment methods or more sophisticated containment technologies do not provide an effective alternative to landfills. Besides, even these more costly methods are criticized as hazardous. The wastes propelled below the earth's surface by injection wells, for example, are sometimes forced upward again by geologic pressures, where they contaminate nearby water sources.

There is another alternative which promises a fundamental solution to the problem of hazardous waste disposal, and that is to attack the problem at its source by restricting the amount of such wastes produced.

This could be done by changing the production process in various industries. In many cases, hazardous substances can be replaced by safer ones. Asbestos can be replaced with man-made mineral fibers in automobile brakes and other applications where insulating materials are required. Soap-based detergents can be used rather than alkyl halide as a de-greasing agent. Chlorinated paraffins can be substituted for PCB in hydraulic fluids. In most cases, there are certain obstacles to product substitution, such as the fact that at high temperatures the mineral oil which can be used as a substitute for PCB is flammable.

But such problems can be overcome, and many people feel that they are a small price to pay for a reduction in the amount of hazardous wastes.

Since the 1940s, many products made with natural organic materials have been replaced with synthetic materials. In the home, many wood and paper-based products have been replaced with plastics, and synthetic polyesters have partially replaced such natural fibers as cotton. In industry, the petrochemical revolution has had an even greater impact, as thousands of new materials and products have been introduced that are both convenient and relatively inexpensive. Now that people are beginning to regard the price of treating or disposing of the chemical by-products of the petrochemical industry as part of the cost we pay for their convenience, there is increasing support for switching back from synthetic to organic materials.

That raises a fundamental question about what we are willing to do as individuals and consumers to protect the environment. If fewer hazardous wastes were produced, there would be fewer chemical by-products to contaminate the environment and threaten our health. Manufacturers could reduce the amount of hazardous wastes by substituting different materials in the production process, by using fewer chemicals to retard spoilage, and so forth. Just as manufacturers have cut back on the production of aerosol cans because of heightened consumer concern about the ozone layer, we could "vote" for a cleaner environment as consumers by choosing not to buy goods associated with dangerous by-products.

What would we be willing to give up in order to reduce the threat of hazardous wastes? Would we, for example, be willing to use fewer plastic containers — which have the advantage of being lightweight and discardable — and to substitute glass containers, which need to be recycled? Would we be willing to give up literally thousands of conveniences — such as TV dinners that are sold, cooked, and often served on throwaway trays, or vegetables that come packaged in a plastic pouch ready to drop into a pan of boiling water?

The question of which conveniences we are prepared to forego is posed most directly by those who advocate recycling on a much larger scale. Recycling offers a practical means of reducing the amount of hazardous wastes but it would require several basic changes.

A comprehensive recycling program such as the one practiced in the Netherlands requires a "conserver consciousness" quite different from the "throwaway mentality" that has been characteristic of American society. It would require new collective arrangements to encourage industries to swap their wastes with one another, so that wastes produced in one industry could be processed for reuse in another.

As the proponents of broader recycling efforts point out, the only way to protect ourselves against hazardous wastes in the long run is to reduce the amount we produce, and recycling offers a practical means of doing just that.

Credit: Courtesy C. P. Houston

'Our theory is that nobody knows it's here, and what nobody knows can't hurt 'em'

Three Options

So these are three quite different options about what to do with the wastes we produce today, and they are options whose consequences affect not just America's industries but the rest of us as well. The choice is between the immediately practical alternative of disposing of dangerous wastes by using landfills, resorting to more costly and technologically sophisticated containment and treatment methods, or taking steps to reduce the amount of hazardous substances produced.

There are many related questions — about economic incentives and disincentives, about new treatment technologies, about what is required if we choose a more comprehensive system of recycling, and about the appropriate role of the government in the task of keeping our nest reasonably clean and safe. With regard to each of these questions, we could learn from the Western European nations which have more experience in alternative waste disposal and treatment methods.

What we need to do first is to consider whether current waste disposal practices represent a prudent balance between our immediate desire for relatively inexpensive and convenient goods, and our long-term obligation to protect public health and safety. When questions arise about what to do with the wastes we produce today, it isn't enough to say "not in *my* backyard." We have to begin thinking about what *should* be done with them.

Defining an Environmental Ethic

> **"We want a healthy economy *and* environmental protection, inexpensive goods *and* high safety standards, plentiful jobs *and* protection against future health hazards. The debate over the environment is a debate about trade-offs and priorities."**

A decade and a half after the first "Earth Day" and the formation of the Environmental Protection Agency, this nation faces some difficult choices on the environment. Unquestionably, there is a broader recognition today that natural systems are bound together in complicated ways. Through the recently recognized phenomenon of acid rain, air pollution affects water and aquatic life hundreds of miles from the source of the pollution. Chemical compounds — both those known to nature and those created recently by the petrochemical industry — move up and down the food chain, permeating the ecological system, affecting plants, animals, and humans in unsuspected ways.

As a nation we have begun to take account of the environment and to regard its protection as a critical national goal. The environmental laws passed since 1970 represent a general recognition that limits should be placed on the pursuit of self-interest in order to ensure a level of environmental protection which is in the public interest.

It was that tension between what is in our immediate self-interest and what is in the public interest that Garrett Hardin wrote about in 1968 in a compelling essay about "the tragedy of the commons." In rural England, as Hardin pointed out, the traditional practice was for farmers to graze their herds on the village commons. Each farmer knew, of course, that there was a limit to the number of animals who could graze on a plot of land. But because each farmer's main concern was for the enlargement of his herd, more and more animals were taken to graze in the commons. Eventually, the cumulative effect of overgrazing destroyed the value of the commons for everyone.

It is still true, as Hardin put it, that "freedom in a commons brings ruin to all." But how then should we protect the public interest and the environmental "commons"? In Hardin's view appeals to individual conscience will never be effective by themselves. The only realistic remedy is "mutual coercion, mutually agreed upon." And that is what our forums should be about, deciding what environmental policies we can agree upon, even if they impose certain restrictions on our actions as individuals.

The Environmental Assault

In earlier times and simpler societies, the wastes produced by humans were absorbed by nature's recycling processes. But the advent of cities posed a challenge to the throwaway system because the amount of filth, wastewater, and other pollutants overwhelmed the capacity of natural systems. Cities, with their high concentrations of people and the volume of wastes and excrement they produced, represented an unprecedented assault on the environment. The industrial revolution and all of the new effluents it produced represented an even more serious assault. As a result of overloading nature's cleansing powers, cities became seriously polluted and many of their residents developed diseases such as typhoid and cholera as a consequence. Grad-

Credit: Courtesy of *Rocky Mountain News*

ually, as our forebears in the nineteenth century realized the high price they were paying for fouling the environment, corrective measures were taken, chief among them the installation of city sewage systems.

In the four decades since the Second World War, the assault on the environment has accelerated. Per capita consumption has increased quite rapidly, and its accompaniment has been increased per capita pollution. Each of us now consumes more energy and more material goods—especially throwaway goods. Rapid increases in the number of automobiles posed a new threat to air quality.

While controlling conventional pollutants is still an issue today, the most pressing environmental problems of the 1980s arise from the fact that many of the substances we have been discarding are man-made materials that cannot be naturally recycled. Unlike virtually everything else that humans discarded in the past, these materials are not biodegradable; they defeat nature's recycling methods. For that reason, dangerous concentrations of toxic chemicals build up over time.

The Political Challenge

The challenge in protecting the environmental "commons" is political as well as intellectual. Decisions need to be made about what we should do, and that brings us back to the choices presented in this issue book. Recognizing that higher environmental standards — like other national goals — have a cost, what measures should be taken?

Let us review those three choices and the questions they force us to confront. The first choice is about where we should draw the line on safety standards. Considering the potential hazards posed by certain chemicals, must we assume that such substances are hazardous until they are proved to be safe? Or is it unrealistic to go so far to try to eliminate risks?

The second issue regarding environmental protection is the one that members of Congress have been debating recently as they consider changes in the "superfund." Should those who claim to have been harmed by toxic chemicals have more clearly defined rights to compensation? Should the petrochemical industry be taxed at a substantially higher level to pay for an accelerated cleanup effort? One choice is to decide that recent efforts are satisfactory, or at least the best we can do considering our other goals as a nation and the resources they require. Another is to substantially redefine victim's rights, and to attach a higher priority to the cleanup effort.

"We look back on the Middle Ages and say, 'No wonder they had bubonic plague. They used to throw their garbage in the streets.' I just hope that in the year 2025 my grandchildren don't look back on this generation and say, 'No wonder they had problems. Look at all the chemicals carelessly introduced into the environment, uncontrolled.'"

— Douglas Costle, former EPA Administrator

Our third choice has to do with the hazardous wastes we produce today. We could continue the current practice of putting most hazardous chemicals into landfills, although this method's virtue—the fact that it is relatively inexpensive—may translate over time into high cleanup costs and health hazards. We could insist that industries choose safer disposal and treatment techniques, even though they are more costly and would mean higher prices. Or we could attack the problem at its source by taking steps to reduce the amount of hazardous chemicals produced, even though that would force us to make substantial changes in consumption patterns, and impose greater cost and some inconvenience.

In each instance, the underlying question is how cautious we should be, and which trade-offs we are prepared to accept between environmental protection and other national goals.

For all of the technical detail in some discussions of hazardous substances, containment, treatment, and disposal alternatives, the underlying issue in the debate about environmental protection is a moral concern. This debate forces us to balance short-term concerns—profitability, convenience, and the maintenance of existing consumption standards—against long-term consequences. Precisely because hazardous wastes remain hazardous for so long, they pose difficult questions about what we should do as stewards of the environment. It has been proposed, and not facetiously, that what this country needs as much as an environmental protection agency is a grandchildren protection agency, an agency specifically charged with reckoning the impact of current decisions on the future, and lobbying on behalf of future generations and their right to a clean and safe environment.

What remains for us is to make some choices about environmental protection, choices that balance short-term concerns and long-term consequences.

For Further Reading

A general introduction to environmental issues can be found in the Council on Environmental Quality's *Environmental Trends* (Washington, D.C.: Government Printing Office, 1981) and the Conservation Foundation's annual publication, *The State of The Environment* (Washington, D.C., 1983). Current news about environmental issues is reported in *Science*, the weekly magazine of the American Association for the Advancement of Science (Washington, D.C.), and the *EPA Journal* (available from the Environmental Protection Agency, Washington, D.C.).

For a discussion of the environmental ethic, see *Footprints on the Planet* by Robert Cahn (New York: Universe Books, 1978). A readable and highly informative discussion of environmental risks can be found in William Lowrance's *Of Acceptable Risk* (Los Altos, California: William Kaufman, 1976). The Sierra Club has compiled a useful reference book, *Hazardous Waste in America* (San Francisco, California, 1982).

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NATIONAL ISSUES FORUM: RELATED MATERIALS

The following materials may be ordered for use with the 1984 National Issues Forum. Please specify quantities for each item in the space provided, fill in complete mailing address, and enclose check payable to: Domestic Policy Association. Orders must be paid in advance.

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2. Difficult Choices about Environmental Protection

Please answer these questions after you have attended the discussion or read the booklet. Answer them without reference to your earlier answers. Then hand in both reports to the forum moderator, or mail them to the Domestic Policy Association in the attached prepaid envelope. (In case no envelope is enclosed, you can send these pages to the Domestic Policy Association at 5335 Far Hills Avenue, Dayton, Ohio 45429.)

Part I:

For each item below, check the appropriate box to indicate if it is something

☐ we should do *now*

☐ something we should *not* do under *any* circumstance

Proposals:	**Should Do Now**	**Should Not Do**	**Not Sure**
A. Drawing the line on safety:			
1. Prevent industry from manufacturing products until it is known that they are safe **PRO:** In the face of uncertainty, we have to err on the side of safety. Many products once believed to be safe have turned out to be dangerous **CON:** Risk is the price of all technological progress; if we insist on "zero risk," it will curtail innovation	☐	☐	☐
2. Require companies to invest in the newest and most effective pollution control technology **PRO:** Environmental pollution should be limited to the greatest extent possible **CON:** Such requirements would be costly in terms of prices, jobs, and the ability of American companies to compete	☐	☐	☐
3. Insist on strict enforcement of environmental standards regardless of its effect on jobs or profits **PRO:** Public health is a paramount concern that outweighs all others **CON:** We must strike a balance between controlling pollution and other national goals such as economic prosperity and low unemployment	☐	☐	☐
B. Assigning responsibility for environmental damages:			
4. Change the laws to make it easier for those whose health has been damaged by environmental hazards to be promptly compensated **PRO:** Victims have a right to prompt compensation, something that current laws do not provide **CON:** So many people could make a plausible claim that their health has been damaged that the courts would be flooded with litigation; settlements might pose an unbearable burden on some industries	☐	☐	☐
5. Make the government, not industry, pay most of the cost of cleaning up old hazardous waste dumps **PRO:** Wastes are generated by the production of goods which we all use **CON:** Corporations that dumped their wastes benefited most directly, and they — not the taxpayers — should bear all the cost of cleanup	☐	☐	☐
6. Expand the cleanup of hazardous waste dumps, even if taxes have to be raised substantially for both corporations and individuals **PRO:** Cleaning up the hazardous waste sites around the nation requires much more money than is currently devoted to this task **CON:** Neither corporations nor individuals can afford to pay higher taxes	☐	☐	☐

C. Balancing current costs against potential hazards:

	Should Do Now	Should Not Do	Not Sure
7. Require individuals and corporations to recycle hazardous wastes	☐	☐	☐
PRO: The production of these substances poses a severe health threat to current and future generations. **CON:** With current technology, recycling is both impractical and too expensive			
8. Severely restrict the disposal of hazardous wastes in landfills	☐	☐	☐
PRO: Landfills are intrinsically unsafe and will eventually leak. **CON:** Landfills are the cheapest method of disposing of hazardous wastes and they are also getting safer and safer			
9. Prohibit the sale of common goods such as plastic garbage bags and synthetic fabrics whose production generates hazardous wastes	☐	☐	☐
PRO: Alternative products are available and we should use them. **CON:** To ban all such goods would require major changes in our lifestyle			

Part II:

Check the appropriate box to indicate whether you agree or disagree with each of these statements.

	Agree	Disagree	Not Sure
10. We're not doing nearly enough as a nation to protect ourselves or the environment from pollution	☐	☐	☐
11. Existing environmental regulations already pose an unnecessarily large burden on many American industries	☐	☐	☐
12. I would be willing to pay more as a taxpayer or consumer to ensure a cleaner and safer environment	☐	☐	☐

Part III:

Background Questions

13. Which of the following DPA activities did you participate in?
- Read the booklet ☐
- Attended a forum ☐
- Both ☐
- Neither ☐

14. Did you participate in a DPA forum *last* year?
- Yes ☐
- No ☐

15. Did you (or will you) participate in DPA forums on other topics *this* year?
- Yes ☐
- No ☐

16. Which of these age groups are you in?
- Under 18 ☐
- 18 to 29 ☐
- 30 to 44 ☐
- 45 to 64 ☐
- 65 and over ☐

17. Are you a man or woman?
- Man ☐
- Woman ☐

"I know no safe
depository of the
ultimate powers
of the society but the
people themselves;
and if we think
them not enlightened
enough to exercise
their control with a
wholesome discretion,
the remedy is not
to take it
from them, but to
inform their discretion
by education."

Th Jefferson